Amendments to the Claims

Please amend the claims as follows. This listing of the claims will replace all prior versions, and listings of claims, in the application:

We claim:

Claims 1 to 10 are canceled.

11.(Currently amended) A method of decoding information encoded by the positions and intensities of spectral lines in the emission ~~characteristics~~ spectrum of quantum dots in a carrier medium, wherein a set of codes in a code book is characterized by different combinations of said positions and intensities, ~~in a carrier medium,~~ comprising:

exciting the quantum dots in said carrier medium to initiate fluorescence;

sensing the resulting emission spectrum of the quantum dots;

performing a deconvolution operation to separate the spectral lines in said emission spectrum;~~and~~

processing the resulting ~~emission spectra~~ data to find the positions and intensities of the spectral lines in said emission spectrum; and

extracting ~~said~~ the decoded information by reference to said code book ; and

wherein the de-convolution operation is represented by the equation $\Sigma_i\, k(\lambda i) \cdot \delta(\lambda - \lambda i) = IFT\{ FT[I(\lambda)] / FT[p(\lambda)] \}$,

where $\delta(\lambda)$ represent an impulse function, $k(\lambda i)$ is the intensity of a $\delta(\lambda)$ at λi, $p(\lambda)$ denotes the profile function of the spectrum of quantum dots.

12. (Currently amended) A method as claimed in claim 11, wherein said emission spectra are pre-processed to remove noise ~~and ensure spectral line separation~~.

13.(Original) A method as claimed in claim 12, wherein said noise is removed with a digital filter.

14.(canceled)

15.(canceled)

16.(canceled)

17.(Currently amended) An apparatus for decoding information encoded by the positions and intensities of spectral lines in the emission characteristics of quantum dots in a carrier medium, wherein a set of codes in a code book is characterized by different combinations of said positions and intensities, comprising:

a light source for exciting said quantum dots to emit light;

a spectroscopic detector for ~~detecting~~ sensing the emission spectrum of the ~~said~~ emitted light; and

a processor for extracting said encoded information from the emission characteristics of said quantum dots by

performing a de-convolution operation to separate the spectral lines in said emission spectrum;

processing the resulting data to find the positions and intensitics of the spectral lines in said emission spectrum; and

extracting the decoded information by reference to said code book; and

wherein the de-convolution operation is represented by the equation $\Sigma_i\ k(\lambda i) \cdot \delta(\lambda - \lambda i) = IFT\{ FT[f(\lambda)] / FT[p(\lambda)] \}$,

where $\delta(\lambda)$ represent an impulse function, $k(\lambda i)$ is the intensity of a $\delta(\lambda)$ at λi, $p(\lambda)$ denotes the profile function of the spectrum of quantum dots.

18. (Currently amended) An apparatus as claimed in claim 17, wherein said processor is responsive to the intensity and emission spectra of said quantum dots to extract said encoded information.

19.(Original) An apparatus as claimed in claim 18, wherein said processor includes a digital filter for removing noise.

20.(Canceled)

21.(Original) An apparatus as claimed in claim 17, wherein said detector is coupled to said light source by a first optical fiber surrounded by a bundle of optical fibers connected to said light source.

22.(Currently amended) An apparatus as claimed in claim ~~20~~ 21, wherein said bundle of optical fibers terminates in an inverted funnel.

23.(Currently amended) An apparatus as claimed in claim 17, wherein said processor is a computer connected to said spectrum ~~senser~~detector.

24.(New) A method as claimed in claim 11, wherein said de-convolution operation is performed in the Fourier domain.

25.(New) An apparatus as claimed in claim 17, wherein said de-convolution operation is performed in the Fourier domain.